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## Pumpkin Cultivar Evaluation for Northern Indiana, 2003

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## **Pumpkin Cultivar Evaluation for Northern Indiana, 2003**

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Pumpkin varieties and experimental lines were evaluated at the Kurtz Farm in Allen County, Indiana. Twenty-two jack-o-lantern types, 4 pie types, and 4 mini-pumpkins were included in the trial.

### **Materials and Methods**

Separate but adjacent trials were conducted for jack-o-lantern, pie, and mini-pumpkins. Each trial was arranged as a randomized complete block design with two replications. For jack-o-lantern and pie pumpkins, one plot of a variety included two 48-ft. rows spaced 10 ft. apart. Twenty-four seeds per row were seeded and thinned to 12 plants per row. Between plot spacing varied from 10.5 to 12.5 ft. Final plant population for jack-o-lantern and pie pumpkins was estimated at 1013 plants per acre. For mini-pumpkins one plot was a single 48-ft. row per variety, with 10 to 12.5 ft. between rows. Forty-eight seeds per row were seeded and thinned to 24 plants per row. Final plant population for mini-pumpkins was estimated at 2178 plants per acre.

The trial was located in a commercial pumpkin field on a sandy loam soil. Fertilization and pest management practices followed standard practices for the farm. In the Fall of 2002 250 lb./A 0-15-40 was applied. On June 5, 2003, 100 lb./A 46-0-0 was applied. On June 6, 2003, pumpkins were seeded by hand-dropping seed into a modified soybean planter. The herbicides Strategy and Sandea, cultivation, and handweeding were used to control weeds. The insecticide Pounce was applied as needed to control cucumber beetles and other insect pests. The fungicide Bravo was applied twice a month from July through mid-August. Either Quadris, Champ, or Flint was included with Bravo on a rotating schedule.

Emergence was recorded on June 24 when plants were at the 2 to 3 true leaf stage, and plants were then thinned to the desired density. When the final stand included two plants very close together, one was transplanted farther away so that plants were about 4 ft. apart for jack-o-lanterns and pie pumpkins, and 2 ft. apart for mini-pumpkins. For one variety, RPX03101, there was not enough seed, and final stand averaged only 19 plants per plot rather than the desired 24. On August 6 vines were turned so that they would not grow into neighboring plots. At this time some varieties had completely filled in between the rows. The amount of row area covered by the vines was rated as 1=50% to 67%; 2=67% to 83% and 3=83% to 100%. On September 10 - 13 all mini-pumpkin plots and the first replication of the other plots were harvested. Mini-pumpkins were categorized as marketable if not diseased, or cull if diseased. Jack-o-lantern and pie pumpkins were categorized as marketable if not diseased and if rind was entire, and cull otherwise. Marketable and cull pumpkins were further categorized as orange, if over 90% of surface was orange, or turning, if pumpkins had begun to turn color but less than 90% of the surface was orange. Total number and weight of pumpkins in each category were determined. Characteristics of fruit from the first replication were rated on September 13. Color was rated as light, medium or dark orange. Shape was described as squat, round, oblong, or tall. Stem thickness and stem length were rated on a scale of 1 (thin or short relative to the size of the pumpkin) to 9 (thick or long). The depth of sutures was rated as shallow (L), medium (M), or deep (H). The uniformity of size and shape was rated as 1 (not uniform) to 9 (very uniform). An

overall rating of fruit quality was given on a scale of 1 (poor) to 9 (excellent). On September 26 remaining plots were harvested and fruit categorized, counted and weighed as described. Yield and number of fruit per plot were converted to yields and number of fruit per acre based on estimated plot size. The percent of marketable pumpkins (by number) that was orange was calculated. The percent of all pumpkins (by number) that was cull was calculated. Data were subjected to analysis of variance followed by mean separation using Fisher's protected LSD at  $P \leq 0.10$ .

## Results and Discussion

*Jack-o-Lantern Pumpkins.* The two replications differed in yield and number of pumpkins produced, probably in part because of the different harvest dates. Averaged over all jack-o-lantern varieties, the number of marketable orange fruit per acre was 70% more in the second replication which was harvested on Sept. 26, than the first, which was harvested on Sept. 10: 1582/A vs. 927/A. The yield of orange fruit was 60% higher in the second replication: 15.3 tons/A vs. 9.5 tons/A. If all marketable fruit, orange plus turning, are considered, the difference between replications is not so large: 2233 pumpkins/A vs. 2001/A and 20.1 tons/A vs. 17.6 tons/A in the second and first replications, respectively. Average weight of an orange pumpkin didn't differ between the two replications (21.1 lb. for rep. 1, 20.4 lb. for rep. 2), but the average weight of any marketable pumpkin, including orange and turning, was almost 6% greater in rep 2 (18.8 lb. vs. 17.8 lb.). The comparisons of varieties below are based on the average of the two replications. The exception to this is the consideration of earliness, for which data from the two replications are reported separately.

The jack-o-lantern pumpkins can be loosely grouped based on average weight per pumpkin. The five or six heaviest pumpkins, those 25 lb. or over if only fully orange marketable pumpkins are considered, or 22 lbs. and over if fully and partially orange pumpkins are considered, included RPX03507, ACX103, Harvest Time, RPX03503, RPX03501 and Gold Medal (Table 1). RPX03507 was the largest, averaging 34 lb. each for fully orange pumpkins, and almost 27 lb. if both orange and turning pumpkins are considered. Yield of orange pumpkins ranged from 12 to 21 tons per acre and yield of orange plus turning pumpkins ranged from 18 to 25 tons per acre. Considering only orange fruit, RPX03503, ACX103 and Harvest Time were the three highest yielding and Gold Medal was the lowest yielding for this size group. If both orange and turning fruit are considered, RPX03503 and RPX03507 were the highest yielding. Pumpkin counts ranged from 971 to 1562 per acre for completely orange fruit, and from 1604 to 2174 per acre for orange and turning combined. RPX03503 produced the greatest number of orange pumpkins per acre, and Gold Medal the fewest, but the other large fruited varieties did not differ significantly in terms of number of fruit produced per acre. The earliest of these large pumpkins was ACX103, for which fully orange pumpkins made up over 80% of the Sept. 10 harvest of marketable fruit. The latest were RPX03501 and RPX03507 for which fully orange pumpkins made up 24% and 48%, respectively, of marketable fruit harvested on Sept. 10. By Sept. 26, over 90% of the marketable fruit were orange for Harvest Time and Gold Medal, over 80% for RPX03503 and 03501; 78% for ACX103; and 45% for RPX03507. RPX03507 was considered the most promising of the numbered lines. The named varieties in this size group all performed well; they differ in shape and color (Table 2), which should be taken into consideration in determining their suitability. Producers interested in pumpkins on the smaller end of this range should also consider varieties at the upper end of the next group.

The next group of pumpkins includes those that averaged 17 to 24 lb. for orange fruit, or 15 to 20 lb. for orange plus turning fruit (Table 1). Marketable yield of orange pumpkins for these 11 varieties ranged from 9 to 16 tons per acre and of orange plus turning pumpkins from 15 to 22 tons per acre. Yield rank varied depending on whether only orange or all marketable fruit was considered. For all marketable fruit, Gold Gem, Aladdin and RPX03517 were the top three and out-yielded the bottom two, Howden and REX1002. Other varieties were intermediate. If only orange pumpkins are considered, REX1003 replaces REX1002 among the lowest yielding varieties. The number of pumpkins per acre ranged from 612 to 1498 for orange pumpkins and 1562 to 2343 for orange plus turning pumpkins. RPX03517, Magic Lantern and Gold Gem produced more marketable pumpkins (orange plus turning) than REX1002 and Howden; other varieties were intermediate. If only orange pumpkins are considered, REX1003 replaces REX1002 as one of the two lowest-producing varieties, and Magic Lantern drops from the top of the list to the middle. The earliest of these varieties included REX1002, RPX03517 and Gold Gem, all with 50% to 60% of the marketable fruit harvested on Sept. 10 considered orange, and with over 70% of marketable fruit harvested on Sept. 26 considered orange. The latest maturing included REX1003 and Magic Lantern, both with less than 30% orange among marketable fruit on the Sept. 10 harvest. Based on yield and fruit appearance, promising named varieties in this size grouping were Gold Gem and Aladdin, followed by Magic Lantern, Phantom and Big Rock. It is important to recognize that these last three have smaller vines than Gold Gem and Aladdin (Table 2); they did not fill in the 12 feet between rows and presumably could be planted at a closer row-spacing (i.e. 8 ft.) with a proportional increase in yield. ACX102 yielded fairly well, but the light color, short and thin stem and relatively non-uniform fruit shape and size make it less promising given current market demands. Producers interested in pumpkins on the smaller end of this range should also consider varieties at the upper end of the next group.

The final group of jack-o-lantern varieties included those with orange fruit averaging 11 to 14 lb. and orange plus turning fruit averaging 11 to 13 lb (Table 1). Marketable yield of orange pumpkins ranged from 8 to 13 tons per acre, and of orange plus turning pumpkins from 14 to 19 tons per acre. Racer produced the highest yield of orange pumpkins, and Sorcerer the lowest, with other varieties (Gold Standard, RPX03516, and Gold Bullion) intermediate. Considering all marketable pumpkins, Gold Bullion produced the greatest yield and RPX03516 the least, but the difference was not statistically significant. Numbers of orange pumpkins ranged from 1266 to 2300/A and numbers of orange plus turning pumpkins ranged from 2068 to 2934/A. Racer and Gold Standard produced more orange pumpkins per acre than the other three varieties. If orange and turning pumpkins are considered, the number of pumpkins produced per acre was similar for four varieties, which all produced about 25% more pumpkins than RPX03516. Racer was the earliest of these varieties, with orange fruit representing over 75% of the marketable pumpkins harvested on Sept. 10, and over 95% on Sept. 26. Sorcerer and Gold Bullion were the latest of these varieties, with orange fruit representing less than 35% of the marketable pumpkins harvested on Sept. 10, and less than 60% on Sept. 16. Based on yield and pumpkin appearance (Table 2), Racer and Gold Standard were the most promising varieties in this size class. Sorcerer produced very attractive dark orange pumpkins, making it worth further consideration, but the stem was rated as thin which may not be suitable for some markets. Gold Bullion fruit seemed more variable in shape than others in this group, but otherwise the variety performed well. The vines of these varieties were not as large as many of the larger-fruited jack-o-lanterns; none had

completely filled in the rows when vine ratings were taken in early August. RPX03516 appeared to have the smallest vines, Gold Standard and Sorcerer intermediate, and Gold Bullion and Racer the largest. These varieties could presumably be planted at a narrower row spacing (6 to 8 ft. rather than 12 ft.) with a proportional increase in yield.

*Pie Pumpkins.* Four pumpkin varieties had fruit under 10 lb. and were considered pie pumpkins (Table 1). Schooltime and Neon averaged just over 8 lb. per pumpkin, Orange Smoothie averaged just under 5 lb. per pumpkin, and Pik-a-Pie averaged just over 4 lb. Marketable yield ranged from 5.8 to 13.8 tons per acre if only orange pumpkins are considered and from 9.7 to 15.4 tons per acre if both orange and turning pumpkins are considered. Schooltime produced the greatest yield, followed by Neon, then Orange Smoothie, and then Pik-a-Pie. The number of marketable pumpkins per acre ranged from 2807 to 3398 for orange pumpkins and 3419 to 4791 for orange and turning pumpkins combined. The number produced per acre didn't differ among varieties if only orange pumpkins were considered. If both orange and turning pumpkins were considered, Orange Smoothie and Pik-a-Pie produced more fruit than Schooltime, and Neon produced the fewest pumpkins per acre. Pik-a-Pie had the lowest percentage of cull pumpkins, 1.4%, compared to 7.7% to 12.9 % for the other varieties. All of these varieties had smaller vines than the larger pumpkins; Orange Smoothie appeared to have the smallest vines (Table 2). Neon pumpkins were mostly yellow beginning at fruit set, with a green patch near the stem. Their bright orange color was distinctive. Orange Smoothie is often grown for use as painted pumpkins, because the skin is smooth and sutures are not deep. Neon also has shallow sutures and might be suitable for painting. All four of these varieties appear to be suitable for production in the Midwest.

*Mini-pumpkins.* Four mini-pumpkins were evaluated. Marketable fruit were not separated based on whether they were orange or turning because most were orange. Average size ranged from 0.43 to 0.90 lb. (6.9 to 14.4 oz.) (Table 1). RPX03102 was the largest and RPX03101 the smallest. Marketable yield ranged from 2.8 to 7.8 tons per acre, and 9257 to 20817 mini-pumpkins per acre. RPX03101 produced the greatest number of fruit and Wee-B-Little the fewest. RPX03102 produced the highest yield per acre, and Wee-B-Little the lowest. Jack-B-Quik and RPX003101 were both small and squat with deep sutures (Table 2). Yields of the two were similar. RPX03101 was rated as having a thicker stem and darker color than Jack-B-Quik. RPX03102 and Wee-B-Little both produced round to oblong fruit with shallow sutures. Wee-B-Little was rated as being darker orange and more uniform than RPX03102. All of the mini-pumpkins had relatively small vines that could be grown on a narrower row spacing. Wee-B-Little and RPX03102 could be described as having almost bush-type growth habits; RPX03101 as bush to vine; and Jack-B-Quik as a vine growth habit. RPX03101 and Wee-B-Little were the most promising of the mini-pumpkins.

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Table 1. Yield and fruit size of 30 pumpkin varieties, Allen County, Indiana, 2003.

Table 1. Yield and fruit size of 100 pumpkin varieties, Allen County, Indiana, 2000.												
Cultivar	Seed Source	Marketable Pumpkins								All Pumpkins		
		Orange			Orange+Turning			%Orange (by no)		Yield	Number	Cull
		Ave. Wt.	Yield	Number	Ave. Wt.	Yield	Number	Rep. 1	Rep.2			
		lb.	T/A	No./A	lb.	T/A	No./A	%	%	T/A	No./A	% by no
Jack-o-Lantern Pumpkins												
RPX03507	RU	34.3	14.8	865	26.7	25.1	1878	47.6	44.7	27.1	2026	7.3
ACX103	AC	27.7	18.8	1372	25.5	21.7	1709	81.8	78.4	24.2	1899	10.2
Harvest Time	AC	26.7	18.8	1414	24.5	23.0	1878	53.3	97.7	25.3	2068	9.1
RPX03503	RU	26.7	20.8	1562	23.2	25.3	2174	59.2	83.3	26.6	2300	5.6
RPX03501	RU	24.7	12.8	1119	19.3	20.8	2153	24.1	83.3	23.0	2427	11.3
Gold Medal	RU	24.7	11.9	971	22.8	18.1	1604	34.1	96.9	19.3	1688	5.1
Aladdin	RI	24.1	12.8	1076	19.8	20.5	2068	42.2	60.4	21.4	2174	4.8
Autumn King	RU	23.0	11.3	992	19.8	19.7	1984	39.6	60.9	22.0	2279	12.9
REX1003	RU	22.1	6.7	612	18.9	18.5	1963	22.2	39.6	19.7	2068	5.1
Gold Gem	RU	21.6	16.3	1498	19.0	21.9	2300	52.7	77.8	22.4	2343	1.8
Big Rock	JS	21.4	10.2	992	18.5	16.6	1794	32.5	75.6	18.2	1963	8.6
Howden	RI	21.2	7.9	739	19.3	15.0	1562	41.0	54.3	15.5	1604	2.4
REX1002	RU	19.5	10.8	1119	17.4	14.7	1688	57.9	73.8	15.8	1815	7.0
RPX03517	RU	19.4	15.1	1583	17.5	20.5	2343	53.6	81.8	21.3	2427	3.4
ACX102	AC	19.1	11.5	1182	17.9	18.9	2089	45.7	62.5	21.2	2364	13.5
Magic Lantern	RI	18.1	9.6	1119	15.0	17.5	2343	26.4	67.2	18.6	2490	6.0
Phantom	RU	16.8	9.3	1097	15.6	15.6	1984	45.9	61.4	17.0	2216	11.2
Gold Bullion	RU	14.5	9.9	1393	13.4	19.2	2870	35.0	59.2	20.3	3018	5.2
RPX03516	RU	14.1	10.4	1372	13.3	14.4	2068	45.2	76.1	15.5	2237	8.5
Sorcerer	RI	13.5	8.5	1266	12.2	17.9	2934	30.2	53.9	18.2	2976	1.4
Gold Standard	RU	12.1	11.9	1963	11.5	14.5	2533	68.3	86.7	15.8	2786	8.8
Racer	JS	11.6	13.2	2300	11.1	14.7	2659	76.7	95.5	16.6	3018	11.9
LSD 0.10**		3.26	4.37	496	1.78	5.20	590			4.64	539	8.55
Pie Pumpkins												
Schooltime	ST	8.2	13.8	3398	8.1	15.4	3820	81.0	95.9	16.7	4221	9.4
Neon	ST	8.1	13.2	3250	8.0	13.7	3419	100.0	90.5	15.0	3925	12.9
Orange Smoothie	ST	4.9	7.1	2934	4.8	11.6	4791	45.5	76.1	12.5	5192	7.7
Pik-A-Pie	RU	4.1	5.8	2807	4.2	9.7	4601	36.5	83.3	9.8	4664	1.4
LSD 0.10		0.619	4.36	1748	0.387	1.06	222			1.70	542	6.3
Mini-pumpkins												
RPX03102	RU	no data	no data	no data	0.90	7.84	17424	no data	no data	8.21	18422	5.36
Wee-B-Little	RU	no data	no data	no data	0.60	2.79	9257	no data	no data	2.80	9302	0.42
Jack-B-Quik	RU	no data	no data	no data	0.43	3.47	16244	no data	no data	3.52	16471	1.52
RPX03101	RU	no data	no data	no data	0.36	3.74	20827	no data	no data	3.77	21009	0.84
LSD 0.10					0.36	1.25	1792			1.10	1191	NS

\*RU=Rupp Seeds, AC=Abbott&amp;Cobb, JS=Johnny's Selected Seeds, RI=Rispens Seeds, ST=Stokes Seeds.

\*\*Means differing by more than this amount differ significantly at P≤.10 according to Fisher's protected LSD.

Table 2. Pumpkin vine vigor and pumpkin fruit characteristics for 30 varieties of pumpkins, Allen County, Indiana, 2003.

		Vine Vigor <sup>2</sup>	Fruit Size <sup>3</sup>	Color <sup>4</sup>	Shape <sup>5</sup>	Stem Thickness <sup>6</sup>	Stem Length <sup>6</sup>	Sutures <sup>7</sup>	Uniformity <sup>8</sup>	Overall <sup>9</sup>
<i>Jack-o-Lantern Pumpkins</i>										
RPX03507	RU	3	L	M	ob-tall	8	7	M	7	7
ACX103	AC	2.5	L	L	ob	7	5	L	6	6
Harvest Time	AC	2.5	L	L	tall	6	5	L	6	6
RPX03503	RU	3	L	L	tall-ob	3	5	H	6	5
RPX03501	RU	3	M	D	ob	4	7	H	6	7
Gold Medal	RU	3	M	M	rd-ob-tall	8	5	L	4	6
Aladdin	RI	3	M	D	ob	4	5	L	6	6
Autumn King	RU	3	M	M	ob-rd	5	5	M	5	4
REX1003	RU	3	M	D	rd-ob	6	7	L	5	7
Gold Gem	RU	3	M	M	ob	4	6	H	6	7
Big Rock	JS	2	M	D	rd-ob	5	5	H	7	7
Howden	RI	3	M	D	ob	6	4	H	5	6
REX1002	RU	3	M	D	ob-tall	7	6	L	5	6
RPX03517	RU	3	M	M	ob	8	5	M	7	7
ACX102	AC	1.5	M	L	tall-ob	2	3	L	4	3
Magic Lantern	RI	2.5	M	M	ob	4	5	M	7	7
Phantom	RU	2.5	M	D	ob	6	4	M	7	7
Gold Bullion	RU	2.5	S-M	M	sq-rd-ob	7	5	L	4	4
RPX03516	RU	1.5	M-S	M	rd-ob	6	5	L	5	5
Sorcerer	RI	2	S	D	ob	2	5	M	5	7
Gold Standard	RU	2	S	M	rd-ob	6	5	L	5	5
Racer	JS	2.5	S	M	sq-rd	7	6	M	7	7
<i>Pie Pumpkins</i>										
Schooltime	ST	2	L	M	sq-rd	5	5	L	6	7
Neon	ST	2	L	L	rd-ob	5	5	M	5	6
Orange Smoothie	ST	1.5	M	L	rd-ob	4	5	L	7	6
Pik-A-Pie	RU	2	M	M	sq-rd-ob	7	7	M	7	6
<i>Mini-pumpkins</i>										
RPX03102	RU	1.5	L	L	sq-rd-ob-tall	6	6	L	1	2
Wee-B-Little	RU	1	S	D	rd-ob	6	5	L	5	6
Jack-B-Quik	RU	2	S	L	sq	2	4	H	5	4
RPX03101	RU	2	S	M	sq	8	4	H	5	6

<sup>1</sup>Vine vigor evaluated on Aug. 6 for 2 replications of each variety; fruit characteristics evaluated on Sept. 13 for one replication per variety.

<sup>2</sup>3=100% cover; 2>75% cover; 1>50% cover

<sup>3</sup>L=large, M=medium, S=small (within type).

<sup>4</sup>D=dark orange; M=Medium orange; L=light orange.

<sup>5</sup>rd=spherical (height = diameter); ob=oblong, taller than wide (height>diameter); tall=(height >>diameter); squat=not as tall as wide (height<diameter).

<sup>6</sup>1= thin or short relative to size of pumpkin; 5=average relative to size of pumpkin; 9=thick or long relative to size of pumpkin.

<sup>7</sup>L=shallow sutures; M=medium sutures; H=deep sutures.

<sup>8</sup>1=poor uniformity; 5=average; 9=excellent uniformity of size and shape.

<sup>9</sup>1=very unattractive overall; 5=average; 9=very attractive overall.